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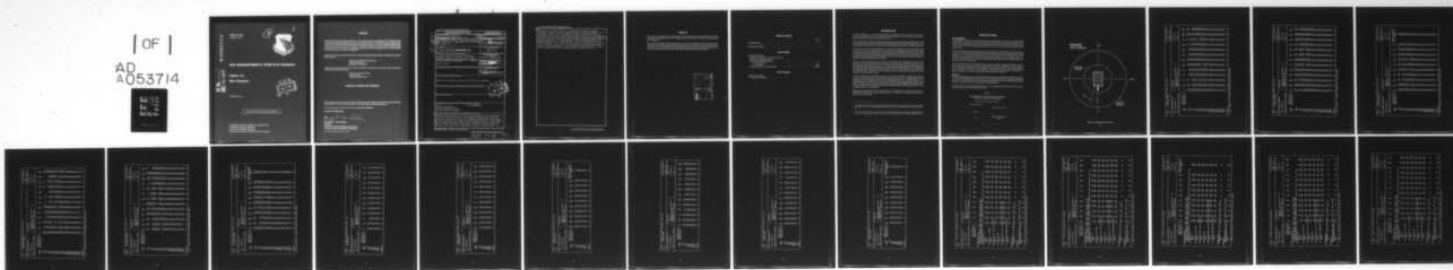
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AMRL-TR-75-50
Volume 118



USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK

Volume 118

MD-4 Generator



DECEMBER 1977

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AEROSPACE MEDICAL RESEARCH LABORATORY
AEROSPACE MEDICAL DIVISION
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

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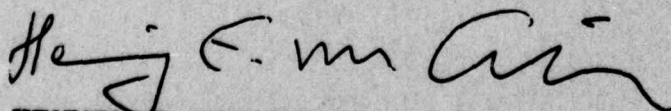
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FOR THE COMMANDER



HENNING E. VON GIERKE

Director

Biodynamics and Bioengineering Division
Aerospace Medical Research Laboratory

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The MD-4 Generator is a motor driven generator set designed to furnish alternating current for hangers, maintenance shops and industrial facilities where precision bench mockup and test equipment requiring precise power are operated and tested. This report provides measured data defining the bioacoustic environments produced by this unit operating inside a large aircraft hanger at normal rated conditions. Near-field data are reported for 37		



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locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, "USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Application," AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.

PREFACE

This report was prepared by the Biodynamic Environment Branch, Aerospace Medical Research Laboratory, under Project/Task 723-104, Measurement and Prediction of Noise Environments of Air Force Operations.

The author acknowledges the efforts of Mr. Robert G. Powell who assisted in collection of the noise data, and Mr. John N. Cole who established the data analysis requirements and assisted in the preparation of this report. Mr. Henry Mohlman and Mr. David Eilerman of the University of Dayton assisted in the mechanics of data processing, and Mrs. Peggy Massie typed and prepared the graphics.

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NEAR-FIELD NOISE

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INTRODUCTION

The MD-4 Generator is a motor-driven generator set designed to furnish alternating current for hangars, maintenance shops, and industrial facilities where precision bench mockup and test equipment requiring precise power are operated and tested.

This volume provides measured data defining the bioacoustic environments produced by this unit. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with operations of the MD-4 generator.

This volume is one of a series published by the Aerospace Medical Research Laboratory (AMRL) under the same report number (AMRL-TR-75-50) as a multi-volume handbook that quantifies the noise environments produced at flight/ground crew locations and in surrounding communities by operations of Air Force aircraft and ground support equipment. The far-field, community-type, noise data in the handbook describe the noise produced during *ground operations* of aircraft, ground support equipment, and other ground-based equipment or facilities.

Volume 1 of this handbook discusses the objectives and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. Volume 2 provides a method and data for adjusting the handbook's far-field noise data, which are for standard meteorological conditions (15C temperature, 70% rel humidity, 0.760 meters Hg barometric pressure) to derive comparable data for other meteorological conditions. *Refer to Volumes 1 and 2* (references 1 and 2) for such information because it is not repeated in other handbook volumes.

A cumulative index lists those aerospace systems contained in the handbook, and identifies the specific volumes containing each type of environmental noise data available (i.e., inflight/flight crew and passenger noise, near-field/ground crew noise, far-field/community noise). Volume numbers are assigned sequentially as individual volumes are published. This index is periodically updated as individual volumes are published, and is available upon request from AMRL/BBE, Wright-Patterson AFB, OH 45433. Organizations on the distribution list for the handbook will automatically receive a copy of the updated index as it is generated.

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1. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and Application*, AMRL-TR-75-50 (1), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.
 2. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 2: Procedure to Evaluate Effects of Non-standard Meteorological Conditions on Far-Field Noise*, AMRL-TR-75-50 (2), AMRL, WPAFB, OH, 1975.

NEAR-FIELD NOISE

MEASUREMENTS

A standard MD-4 generator was operated inside, and approximately in the center of a large aircraft hangar (190.5 m long x 95.1 m wide x 18.3 m high) on a concrete floor at normal rated conditions. The hangar walls and ceiling were not acoustically treated. No aircraft were in the vicinity of the unit while being measured. No far-field acoustic data were acquired because of the relatively close proximity of the hangar walls.

Figure 1 identifies 36 noise measurement locations at a height of 1.5 meters above the concrete apron (nominal ear level of ground crew). The 0 degree reference direction passes through the tow bar. These locations are in the acoustic near-field of the source where the sound wave fronts generally do not spherically diverge and the source appears to be spatially distributed (i.e., not a point source). Consequently, these near-field data cannot be extrapolated to longer distances but do properly define the levels at locations close to the unit.

Near-field measurements were also made at ear level at the operator control panel. Table 1 lists the numeric/alphabetic designators used on the data pages in this report to identify the operator measurement location and test conditions. The designator 1/A means operator location 1 and test condition A. Such a descriptor is essential in many handbook volumes that involve multiple combinations of locations/conditions. It is used in this report to maintain format consistency.

RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced by the MD-4 unit at the 37 specified, near-field locations. This table includes the overall, 1/3 octave band, and octave band levels. From these data one can calculate the variety of measures in Table 3 which are widely used to assess the effects of noise on personnel and their performance.

For data at other intermediate near-field locations (i.e., for radial distances less than 4 meters) you can interpolate between the 36 measured data points.

TABLE 1
MEASUREMENT LOCATION AND TEST CONDITION
FOR OPERATOR NOISE MEASUREMENTS

MD-4 Generator, Edwards AFB, 10 May 77

Measurement Location

1

Operator Control Panel

Operation

A
B

Electrically loaded by 24T-8
Unloaded

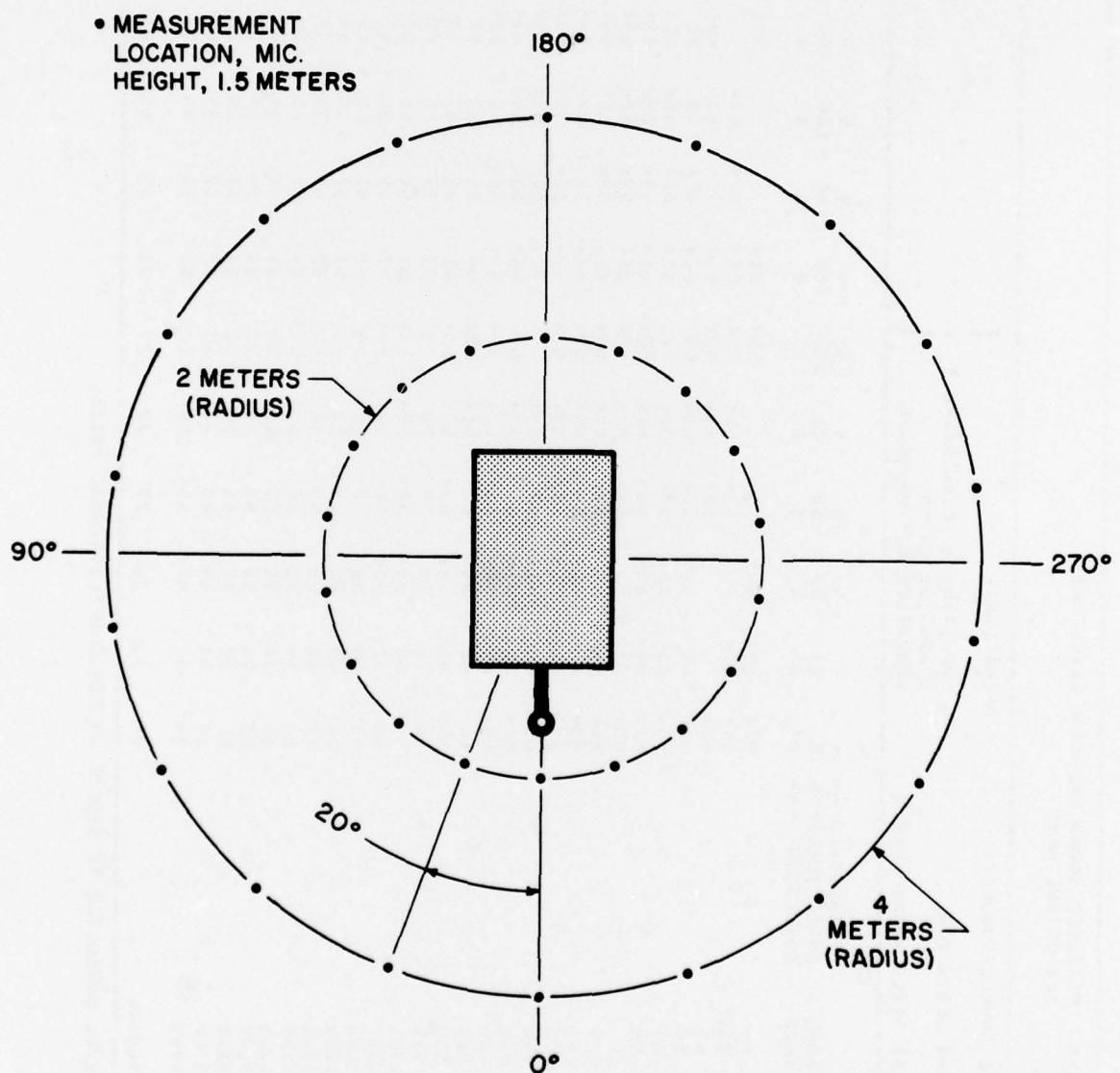


Figure 1. Measurement Locations

TABLE: MEASURED SOUND PRESSURE LEVEL (DOP)															IDENTIFICATION:														
1/3 OCTAVE BAND																													
2.															OMEGA 3.2														
															TEST 77-005-001														
NOISE SOURCE/SUBJECT:															RUN 01														
(OPERATION:																													
(CONDITION A -ELECTRICALLY)															10 MAY 77														
(LOADED BY 24T-8																													
(CONDITION B - UNLOADED)															PAGE F1														
NEAR FIELD NOISE LEVELS																													
DISTANCE (M)->																													
ANGLE (DEG)->																													
CONDITION----																													
FREQ (HZ)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4									
	0	20	40	60	80	100	120	140	160	180	200	220	240																
	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A									
25	57<	55<	54<			55<	54<			57<	54<	55<	57<																
31.5	68<	65<				69<	67<			63<	61<	60<	64<																
40	62<					60<	61<			61<	60<	60<	60<																
50	67<	69	69	66<	63<	68	62<	67<	70	71	73	74	70																
63	59<	60<	60<	57<	56<	58<	58<	61<	60<	60<	62<	63<	60<																
80	61<	60<	60<	60<	61<	62<	61<	59<	62<	62<	63<	64	63<																
100	63<	63<	64<	64<	60<	68<	66<	62<	67<	65<	68<	69<	68<																
125	65<	64<		68<	65<	65<	65<	63<	65<	64<	66<	65<	65<																
160	63<	62<	64<	64<	66<	63<	63<	66<	64<	64<	66<	66<	66<																
200	62<	61<	61<	62<	63<	62<	62<	62<	62<	63<	66<	64<	64<																
250	63<	61<	61<	62<	64<	62<	62<	60<	62<	63<	62<	64<	63<																
315	62<	61<	61<	61<	62<	62<	64<	63<	64<	64<	65<	66	63<																
400	69	65<	64<	61<	62<	62<	64<	65<	66<	66<	65<	64<	65<																
500	66	66	64	62<	61<	62<	64	66	68	67	65	64	64																
630	60<	61<	59<	60<	59<	60<	61<	62	63	63	63	62	62																
800	69	73	68	70	70	71	73	74	75	71	77	75	73																
1000	59<	60	58<	58<	57<	58<	61	62	64	62	63	63	61																
1250	58<	57<	55<	56<	54<	54<	57<	59	60	62	58<	59	58																
1600	58	59	59	57	58	58	61	61	61	59	59	61	61																
2000	56	56	55	54	53	55	58	57	59	59	59	58	58																
2500	59	60	59	59	56	55	60	60	65	62	62	59	60																
3150	63	64	61	60	60	59	64	65	66	65	67	62	61																
4000	55	56	55	53	52	55	56	58	60	61	60	58	56																
5000	57	61	56	61	56	60	59	66	63	60	61	60	61																
6300	60	62	57	61	56	60	63	67	66	65	64	64	62																
8000	51	51	49	48	48	47	52	53	55	55	55	53	51																
10000	50<	50<	47<	46<	46<	47<	50<	52<	54	55	55	51<	51<																
OVERALL	77	78	76	77	77	77	78	79	80	78	80	80	79																
< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.																													

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)																	IDENTIFICATION:			
1/3 OCTAVE BAND																	OMEGA 3.2			
NOISE SOURCE/SUBJECT: (OPERATION:)																	TEST 77-005-001			
MD-4 GENERATOR (CONDITION A -ELECTRICALLY)																	RUN 02			
(LOADED BY 241-8)																	10 MAY 77			
(CONDITION B - UNLOADED)																	PAGE F2			
DISTANCE (M)--> 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4																				
FREQ (HZ)	ANGLE (DEG)-->	260	280	300	320	340	0	20	40	60	80	100	120	140						
CONDITION----	A	A	A	A	A	A	A	A	A	A	A	A	A	A						
25	57<	58<	56<	59<	60<	60<	57<	57<	55<	55<	55<	55<	55<	56<	56<	2				
31.5	66<	67<	66<	59<	69<	69<	68<	67<	64<	65<	67<	67<	67<	66<	66<	2				
40		60<		52<	62<	62<	63<	60<								140				
50	68	72	62<	67<	67<	67<	69	66<	65<	67<	68	68	68	68	68	67<				
63	58<	02<	56<	59<	59<	59<	61<	59<	59<	60<	60<	60<	60<	60<	60<	60<				
80	66	62<	62<	61<	62<	62<	63<	62<	62<	61<	62<	61<	62<	62<	62<	62<				
100	71	67<	67<	65<	64<	64<	66<	63<	65<	65<	66<	66<	67<	67<	67<	67<				
125	64<	63<	65<	70<	64<	64<	66<	63<								69<				
160	63<	65<	65<	63<	62<	62<	72	70	67<	66<	66<	65<	67<	69<	69<	69<				
200	63<	66<	67<	63<	62<	62<	68<	67<	66<	66<	67<	66<	65<	66<	65<	66<				
250	66<	66<	67<	64<	62<	62<	70<	70<	68<	67<	64<	65<	65<	68<	66<	66<				
315	63<	65<	67	69	68	68	68	72	73	69	66	66	66	68	68	68				
400	63<	64<	63<	65<	67	67	73	71	69	68	66	66	67	67	66	66				
500	63<	63<	64	64	66	66	69	68	67	68	65	65	65	67	68	68				
630	60<	60<	62	63	64	64	66	64	64	64	63	62	64	69	69	69				
800	65	72	73	74	78	79	79	73	77	76	75	72	73	82	82	82				
1000	58<	60	60	60	61	61	65	63	64	63	61	61	61	63	67	67				
1250	57<	57<	57<	57<	58	58	63	61	61	59	57<	58	60	64	64	64				
1600	59	59	61	61	60	60	64	62	63	64	61	61	61	63	68	68				
2000	56	56	55	56	56	56	61	60	59	58	57	57	61	61	61	61				
2500	57	56	57	58	63	66	66	63	63	60	59	60	64	65	65	65				
3150	60	59	58	59	64	64	68	68	65	65	61	64	68	69	69	69				
4000	54	52	53	56	57	57	61	61	57	57	56	56	60	63	63	63				
5000	58	56	54	61	60	60	62	67	59	61	64	65	68	65	65	65				
6300	59	56	56	61	62	62	65	68	63	64	65	66	70	68	68	68				
8000	48	47<	47	49	51	51	56	55	52	52	52	52	56	57	57	57				
10000	47<	46<	46<	48<	49<	49<	54	53<	51<	51<	50<	50<	55	57	57	57				
OVERALL	77	79	78	79	81	81	83	81	81	80	79	79	80	84	84	84				
< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.																				

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)										IDENTIFICATION:									
2 1/3 OCTAVE BAND										OMEGA 3.2									
NOISE SOURCE/SUBJECT:										TEST 77-005-001									
MD-4 GENERATOR										RUN 03									
NEAR FIELD NOISE LEVELS										10 MAY 77									
										PAGE F3									
DISTANCE (M) -->										OPERATOR LOCATION									
ANGLE (DEG) -->										TEST CONDITION									
CONDITION -->										1/A									
FREQ (HZ)	2	160	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
25	54	58	56	57	61	57	57	58	59	59	59	59	59	59	59	59	59	59	59
31.5	64	65	64	66	70	67	67	68	68	68	68	68	68	68	68	68	68	68	68
40	60	62	62	65	67	64	64	67	67	67	67	67	67	67	67	67	67	67	67
50	62	67	66	69	70	66	66	67	67	67	67	67	67	67	67	67	67	67	67
63	59	60	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
80	63	63	65	65	65	64	64	65	65	65	65	65	65	65	65	65	65	65	65
100	67	67	68	68	69	68	68	69	69	69	69	69	69	69	69	69	69	69	69
125	66	65	67	66	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
160	70	71	68	66	65	63	63	63	63	63	63	63	63	63	63	63	63	63	63
200	66	67	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
250	68	70	70	67	66	65	65	65	65	65	65	65	65	65	65	65	65	65	65
315	68	68	69	68	68	66	66	67	67	67	67	67	67	67	67	67	67	67	67
400	69	70	70	69	68	66	66	67	67	67	67	67	67	67	67	67	67	67	67
500	68	67	67	67	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
630	67	66	69	67	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
800	73	75	78	72	69	74	74	75	75	75	75	75	75	75	75	75	75	75	75
1000	69	67	66	66	62	61	61	61	61	61	61	61	61	61	61	61	61	61	61
1250	63	63	64	63	59	57	57	59	59	59	59	59	59	59	59	59	59	59	59
1600	64	62	62	64	63	62	61	62	62	62	62	62	62	62	62	62	62	62	62
2000	63	64	63	61	60	57	57	57	57	57	57	57	57	57	57	57	57	57	57
2500	67	67	67	64	62	60	60	62	62	62	62	62	62	62	62	62	62	62	62
3150	68	67	73	69	64	62	61	63	63	63	63	63	63	63	63	63	63	63	63
4000	64	64	64	63	58	55	55	55	55	55	55	55	55	55	55	55	55	55	55
5000	69	69	68	67	63	64	64	64	64	64	64	64	64	64	64	64	64	64	64
6300	70	70	70	68	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
8000	58	59	59	57	53	51	51	52	52	52	52	52	52	52	52	52	52	52	52
10000	59	58	59	55	51	49	49	51	51	51	51	51	51	51	51	51	51	51	51
OVERALL	81	82	83	81	79	79	79	80	82	82	82	82	82	82	82	82	82	82	82

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)														IDENTIFICATION:		
1/3 OCTAVE BAND														OMEGA 3.2		
NOISE SOURCE/SUBJECT: (OPERATION:)														TEST 77-005-001		
MD-4 GENERATOR (CONDITION A -ELECTRICALLY)														RUN 04		
(LOADED BY 24T-8)														10 MAY 77		
(CONDITION B - UNLOADED)														PAGE F4		
NEAR FIELD NOISE LEVELS																
DISTANCE (M)-->																
ANGLE (DEG)-->																
CONDITION----																
FREQ (HZ)	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	0	20	40	60	80	100	120	140	160	180	200	220	240			
	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
25	64<	64<	64<	64<	64<	64<	64<	64<	64<	64<	64<	64<	64<	64<	64<	64<
31.5	68<	68<	68<	68<	68<	68<	68<	68<	68<	68<	68<	68<	68<	68<	68<	68<
40	62<	61<	63<	62<	62<	62<	62<	62<	62<	62<	62<	62<	62<	62<	62<	62<
50	69	66<	68	65<	61<	65<	53<	53<	50<	50<	59<	56<	55<	55<	55<	55<
63	63<	57<	61<	56<	55<	58<	55<	57<	59<	59<	58<	60<	59<	61<	64<	65<
80	63<	60<	59<	57<	55<	58<	61<	62<	61<	63<	59<	61<	63<	63<	64<	64<
100	65<	62<	61<	64<	62<	64<	61<	65<	63<	62<	65<	64<	64<	64<	64<	64<
125	65<	63<	64<	63<	64<	64<	60<	60<	60<	60<	60<	60<	60<	60<	60<	60<
160	66<	62<	64<	63<	64<	64<	60<	60<	60<	60<	60<	60<	60<	60<	60<	60<
200	62<	62<	61<	60<	61<	61<	60<	60<	60<	60<	60<	60<	60<	60<	60<	60<
250	62<	60<	60<	60<	61<	61<	65<	60<	60<	60<	60<	60<	60<	60<	60<	60<
315	61<	60<	60<	60<	61<	61<	65<	64<	63<	64<	66<	63<	61<	61<	61<	61<
400	66<	66<	63<	61<	63<	62<	64<	63<	65<	65<	65<	65<	64<	64<	64<	64<
500	64	60	64	62<	60<	63<	62<	64	67	66	64	65	65	63<	63<	63<
630	61<	61<	59<	59<	58<	61<	60<	64	63	62	64	62	61<	61<	61<	61<
800	67	72	66	72	73	75	66	79	74	74	79	75	76	76	76	76
1000	58<	58<	58<	57<	58<	60	59<	63	63	61	64	63	61	61	61	61
1250	57<	57<	55<	55<	54<	55<	56<	58	58	59	58	58	56<	56<	56<	56<
1600	57	57	59	57	58	60	61	62	60	57	60	60	60	60	60	60
2000	56	55	55	53	53	56	58	57	59	58	58	56	56	56	56	56
2500	59	59	58	57	56	57	59	59	65	63	61	59	58	58	58	58
3150	61	63	61	60	60	60	64	63	66	68	67	62	59	59	59	59
4000	56	56	55	51	51	56	56	57	58	59	58	57	54	54	54	54
5000	61	60	58	63	54	58	63	61	67	59	62	60	57	57	57	57
6300	61	61	58	64	55	59	64	63	68	64	64	64	62	62	62	62
8000	54	50	49	48	48	48	51	52	54	53	52	51	51	51	51	51
10000	51<	49<	48<	47<	44<	46<	50<	51<	54	54	52<	51<	48<	48<	48<	48<
OVERALL	78	77	76	77	77	78	75	80	78	78	81	78	78	78	78	78
< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.																

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB) 1/3 OCTAVE BAND										IDENTIFICATION:																			
2										OMEGA 3.2 TEST 77-005-001																			
NOISE SOURCE/SUBJECT:										RUN 05																			
MU-4 GENERATOR										10 MAY 77																			
NEAR FIELD NOISE LEVELS										PAGE F5																			
DISTANCE (M)-->																													
ANGLE (DEG)-->																													
CONDITION----																													
FREQ (HZ)	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	OVERALL	
25	55	55	57	54	56	55	54	55	56	55	54	55	56	55	54	55	56	55	54	55	56	55	54	55	56	55	54	55	
31.5	56	56	58	55	57	56	55	56	57	56	55	56	57	56	55	56	57	56	55	56	57	56	55	56	57	56	55	56	
40	57	57	59	56	58	57	56	57	58	57	56	57	58	57	56	57	58	57	56	57	58	57	56	57	58	57	56	57	
50	58	58	60	57	59	58	57	58	59	58	57	58	59	58	57	58	59	58	57	58	59	58	57	58	59	58	57	58	
63	59	59	61	58	60	59	58	59	60	59	58	59	60	59	58	59	60	59	58	59	60	59	58	59	60	59	58	59	
80	60	60	62	59	61	60	59	60	61	60	59	60	61	60	59	60	61	60	59	60	61	60	59	60	61	60	59	60	
100	61	61	63	60	62	61	60	61	62	61	60	61	62	61	60	61	62	61	60	61	62	61	60	61	62	61	60	61	
125	62	62	64	61	63	62	61	62	63	62	61	62	63	62	61	62	63	62	61	62	63	62	61	62	63	62	61	62	
160	63	63	65	62	64	63	62	63	64	63	62	63	64	63	62	63	64	63	62	63	64	63	62	63	64	63	62	63	
200	64	64	66	63	65	64	63	64	65	64	63	64	65	64	63	64	65	64	63	64	65	64	63	64	65	64	63	64	
250	65	65	67	64	66	65	64	65	66	65	64	65	66	65	64	65	66	65	64	65	66	65	64	65	66	65	64	65	
315	66	66	68	65	67	66	65	66	67	66	65	66	67	66	65	66	67	66	65	66	67	66	65	66	67	66	65	66	
400	67	67	69	66	68	67	66	67	68	67	66	67	68	67	66	67	68	67	66	67	68	67	66	67	68	67	66	67	
500	68	68	70	67	69	68	67	68	69	68	67	68	69	68	67	68	69	68	67	68	69	68	67	68	69	68	67	68	
630	69	69	71	68	70	69	68	69	70	69	68	69	70	69	68	69	70	69	68	69	70	69	68	69	70	69	68	69	
800	70	70	72	69	71	70	69	70	71	70	69	70	71	70	69	70	71	70	69	70	71	70	69	70	71	70	69	70	
1000	71	71	73	70	72	71	70	71	72	71	70	71	72	71	70	71	72	71	70	71	72	71	70	71	72	71	70	71	
1250	72	72	74	71	73	72	71	72	73	72	71	72	73	72	71	72	73	72	71	72	73	72	71	72	73	72	71	72	
1600	73	73	75	72	74	73	72	73	74	73	72	73	74	73	72	73	74	73	72	73	74	73	72	73	74	73	72	73	
2000	74	74	76	73	75	74	73	74	75	74	73	74	75	74	73	74	75	74	73	74	75	74	73	74	75	74	73	74	
2500	75	75	77	74	76	75	74	75	76	75	74	75	76	75	74	75	76	75	74	75	76	75	74	75	76	75	74	75	
3150	76	76	78	75	77	76	75	76	77	76	75	76	77	76	75	76	77	76	75	76	77	76	75	76	77	76	75	76	
4000	77	77	79	76	78	77	76	77	78	77	76	77	78	77	76	77	78	77	76	77	78	77	76	77	78	77	76	77	
5000	78	78	80	77	79	78	77	78	79	78	77	78	79	78	77	78	79	78	77	78	79	78	77	78	79	78	77	78	
6300	79	79	81	78	80	79	78	79	80	79	78	79	80	79	78	79	80	79	78	79	80	79	78	79	80	79	78	79	
8000	80	80	82	79	81	80	79	80	81	80	79	80	81	80	79	80	81	80	79	80	81	80	79	80	81	80	79	80	
10000	81	81	83	80	82	81	80	81	82	81	80	81	82	81	80	81	82	81	80	81	82	81	80	81	82	81	80	81	
OVERALL	75	75	78	76	79	77	75	78	80	78	76	79	81	80	78	81	83	80	78	81	83	80	78	81	83	80	78	81	
< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.																													

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)		IDENTIFICATION:																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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FREQ (HZ)		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)												
OCTAVE BAND												
2												
NOISE SOURCE/SUBJECT: (OPERATION:)												
HD-4 GENERATOR (CONDITION A -ELECTRICALLY)												
(LOADED BY 24T-8)												
NEAR FIELD NOISE LEVELS (CONDITION B - UNLOADED)												
IDENTIFICATION:)												
OMEGA 3.2												
TEST 77-005-001												
RUN 01												
10 MAY 77												
PAGE J1												
FREQ (HZ)												
DISTANCE (M)-->												
ANGLE (DEG)-->												
CONDITION----												
31.5	69	66	66	69	70	68	67	65	62	61	66	65
63	68	70	69	69	69	65	68	71	71	73	75	71
125	69	68	67	70	70	69	69	70	69	70	72	71
250	67	66	66	67	65	68	66	67	68	69	69	68
500	71	69	68	66	66	68	70	71	70	69	68	69
1000	70	73	69	70	71	74	75	75	72	77	75	73
2000	63	63	63	61	61	64	64	67	65	65	64	65
4000	65	66	63	62	63	65	69	59	67	68	65	64
8000	61	62	58	57	60	63	67	66	65	65	64	63
OVERALL	77	78	76	77	77	78	79	80	78	80	80	79

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)										IDENTIFICATION:	
2										OMEGA 3.2	
NOISE SOURCE/SUBJECT:										TEST 77-005-001	
(OPERATION:										RUN 03	
((CONDITION A -ELECTRICALLY)										10 MAY 77	
((LOADED BY 24T-8)											
((CONDITION B - UNLOADED)										PAGE J3	
NEAR FIELD NOISE LEVELS											
DISTANCE (M)--> 2 2 2 2 2 2 2 2 2 2										2 OPERATOR LOCATION	
ANGLE (DEG)--> 160 180 200 220 240 260 280 300 320 340										TEST CONDITION	
CONDITION-----> A A A A A A A A A A										1/A	
FREQ (HZ)											
31.5	65	67	65	58	69	72	69	71	71	63	71
63	66	69	69	69	68	71	68	69	69	69	71
125	73	73	73	72	70	71	69	71	72	75	82
250	72	73	73	72	70	71	70	71	74	74	80
500	73	73	73	73	71	68	70	70	72	74	78
1000	75	76	78	73	72	69	74	75	79	78	84
2000	70	70	69	68	67	64	64	66	66	69	74
4000	72	72	74	72	67	66	66	66	67	67	77
8000	71	70	71	69	65	65	65	61	63	63	76
OVERALL	81	82	83	81	79	79	79	80	82	83	88

TABLE: MEASURED SOUND PRESSURE LEVEL (DB)												
OCTAVE BAND												
2												
NOISE SOURCE/SUBJECT: (OPERATIONS:)												
MD-4 GENERATOR (CONDITION A -ELECTRICALLY)												
(LOADED BY 24T-8)												
NEAR FIELD NOISE LEVELS (CONDITION B - UNLOADED)												
PAGE J4												
IDENTIFICATIONS:)												
) OMEGA 3.2												
) TEST 77-005-001												
) RUN 04												
) 10 MAY 77												
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TABLE: MEASURED SOUND PRESSURE LEVEL (DB)												IDENTIFICATION:	
OCTAVE BAND													
2													
NOISE SOURCE/SUBJECT:												OMEGA 3.2	
(OPERATION:												TEST 77-005-001	
(CONDITION A -ELECTRICALLY)												RUN 06	
(LOADED BY 24T-8)												10 MAY 77	
(CONDITION B - UNLOADED)												PAGE J6	
NEAR FIELD NOISE LEVELS													
DISTANCE (M)--> 2												2	
ANGLE (DEG)--> 160												300	
CONDITION-----> B												8	
FREQ (HZ)												2	
31.5												280	
63												260	
125												240	
250												220	
500												200	
1000												180	
2000												160	
4000												140	
8000												120	
OVERALL												81	

TABLE: MEASURES OF HUMAN NOISE EXPOSURE										IDENTIFICATION:
3										OMEGA 3.2
NOISE SOURCE/SUBJECT#										TEST 77-005-001
(OPERATION#)										RUN 01
(CONDITION A -ELECTRICALLY)										10 MAY 77
(LOADED BY 24T-8)										
(CONDITION B - UNLOADED)										PAGE H1
NEAR FIELD NOISE LEVELS										
DISTANCE (M)--> 4 4 4 4 4 4 4 4 4 4										4 4 4 4 4 4 4 4 4 4
ANGLE (DEG)--> 0 20 40 60 80 100 120 140 160 180										200 220 240
CONDITION-->> A A A A A A A A A A										A A A A A A A A A A
HAZARD/PROTECTION										
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DB) AT EAR										
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DB) AT EAR										
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)										
NO PROTECTION										
OASLC										
OASLA										
T										
MINIMUM QPL EAR MUFFS										
OASLA*										
T										
AMERICAN OPTICAL 1700 EAR MUFFS										
OASLA*										
T										
V-51R EAR PLUGS										
OASLA*										
T										
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS										
OASLA*										
T										
H-133 GROUND COMMUNICATION UNIT										
OASLA*										
T										
COMMUNICATION										
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)										
PSIL										
ANNOUNCE										
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)										
TONE CORRECTION (C IN DB)										
PNLT										
C										

* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE: MEASURES OF HUMAN NOISE EXPOSURE													
IDENTIFICATION:													
3													OMEGA 3.2
													TEST 77-005-001
													RUN 03
													10 MAY 77
													PAGE H3
NOISE SOURCE/SUBJECT: (OPERATION:)													
MD-4 GENERATOR (CONDITION A -ELECTRICALLY)													
NEAR FIELD NOISE LEVELS (LOADED BY 24T-8)													
(CONDITION B - UNLOADED)													
HAZARD/PROTECTION													
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DB) AT EAR													
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DB) AT EAR													
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)													
NO PROTECTION													
OASLC	81	81	82	80	79	78	79	79	82	82	82	82	88
OASLA	79	79	81	78	76	74	76	77	80	80	80	80	86
T	960	960	807	960	960	960	960	960	960	960	960	960	339
MINIMUM QPL EAR MUFFS													
OASLA*	50	57	57	56	54	54	53	55	57	58	58	58	64
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS													
OASLA*	51	52	52	51	49	49	48	50	52	53	53	53	59
T	960	960	960	960	960	960	960	960	960	960	960	960	960
V-51R EAR PLUGS													
OASLA*	54	54	56	53	51	49	52	53	57	56	56	56	61
T	960	960	960	960	960	960	960	960	960	960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS													
OASLA*	40	41	42	39	37	36	38	39	42	42	42	42	48
T	960	960	960	960	960	960	960	960	960	960	960	960	960
H-133 GROUND COMMUNICATION UNIT													
OASLA*	51	52	54	51	48	47	48	49	52	52	52	52	58
T	960	960	960	960	960	960	960	960	960	960	960	960	960
COMMUNICATION													
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)													
PSIL	72	73	74	71	70	67	70	70	73	74	74	74	79
ANNNOYANCE													
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNOB)													
TONE CORRECTION (C IN DB)													
PNLT	95	96	98	94	92	90	92	93	96	96	96	96	103
C	2	3	3	2	3	3	4	4	5	4	4	4	4
* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.													

TABLE: MEASURES OF HUMAN NOISE EXPOSURE													IDENTIFICATION:	
3													OMEGA 3.2	
NOISE SOURCE/SUBJECT:													TEST 77-005-001	
(OPERATION:)													RUN 04	
(CONDITION A -ELECTRICALLY)													10 MAY 77	
(LOADED BY 24T-8)													PAGE H4	
(CONDITION B - UNLOADED)														
NEAR FIELD NOISE LEVELS														
DISTANCE (M)-->														
ANGLE (DEG)-->														
CONDITION----->														
HAZARD/PROTECTION														
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DB) AT EAR														
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DB) AT EAR														
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)														
NO PROTECTION														
OASLC														
OASLA														
T														
MINIMUM QPL EAR MUFFS														
OASLA*														
T														
AMERICAN OPTICAL 1700 EAR MUFFS														
OASLA*														
T														
V-51R EAR PLUGS														
OASLA*														
T														
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS														
OASLA*														
T														
H-133 GROUND COMMUNICATION UNIT														
OASLA*														
T														
COMMUNICATION														
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)														
PSIL														
ANNOUNCE														
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)														
TONE CORRECTION (C IN DB)														
PNLT														
C-														
* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.														

TABLE: MEASURES OF HUMAN NOISE EXPOSURE										IDENTIFICATION:									
3																			
NOISE SOURCE/SUBJECT:																			
(OPERATION:																			
(MU-4 GENERATOR																			
(CONDITION A -ELECTRICALLY																			
(LOADED BY 24T-8																			
(NEAR FIELD NOISE LEVELS																			
(CONDITION B - UNLOADED																			

